

MLLNVLRICI IVCLVNDGAG KHSEGRERTK TYSLNSRGYF 40  
RKERGARRSK ILLVNTKGLD EPHIGHGDFG LVAELFDSTR 80  
THTNRKEPDM NKVKLFSTVA HGNKSARRKA YNGSRRNIFS 120  
RRSFDKRNTE VTEKPGAKMF WNNFLVKMNG APQNTSHGSK 160  
AQEIMKEACK TLPFTQNIVH ENCDRMVION NLCFGKCISL 200  
HVPNQQDRRN TCSHCLPSKF TLNHLTLNCT GSKNVVKVVM 240  
MVEECTCEAH KSNFHQTAQF NMDTSTTLHH 270

Figure 1. Deduced amino acid sequence of *Xenopus cerberus* protein. SEQ ID NO:1.

Figure 2. Nucleotide sequence of the full-length cerberus DNA derived from the *Xenopus* organizer. The sense strand is on top (in the 5' to 3' direction) and the antisense strand on the bottom line (on the opposite direction). SEQ ID NO:2.

GAATTC	CCAGTCGCTC	AGAAACACTG	CAGGGTCTAG	ATATCATACA	ATGTTACTAA	60
CCTAAGGGTC	GTTCAAGCGAG	TCTTTGTGAC	GTCACAGATC	TATAGTATGT	TACAATGATT	
ATGTACTCAG	GATCTGTATT	ATCGTCTGCC	TTGTGAATGA	TGGAGCAGGA	AAACACTCAG	120
TACATGAGTC	CTAGACATAA	TAGCAGACGG	AACACTTACT	ACCTCGTCCT	TTGTGAGTC	
AAGGACGAGA	AAGGACAAAA	ACATATTCAC	TTAACAGCAG	AGGTTACTTC	AGAAAAGAAA	180
TTCTGCTCT	TTCTGTTTT	TGTATAAGTG	AATTGTCGTC	TCCAATGAAG	TCTTTTCTTT	
GAGGAGCAGC	TAGGAGCAAG	ATTCTGCTGG	TGAATACTAA	AGGTCTTGAT	GAACCCCA	240
CTCCTCGTGC	ATCCTCGTTC	TAAGACGACC	ACTTATGATT	TCCAGAACTA	CTTGGGGTGT	
TTGGGCATGG	TGATTTTCGC	TTAGTAGCTG	AACTATTTGA	TTCCACCAGA	ACACATACAA	300
AACCCGTACC	ACTAAAAGCG	AATCATCGAC	TTGATAAACT	AAGGTGGTCT	TGTGTATGTT	
ACAGAAAAGA	GCCAGACATG	AACAAAGTCA	AGCTTTTCTC	AACAGTTGCC	CATGGAAACA	360
TGCTTTTCT	CGGTCTGTAC	TTGTTTCAGT	TCGAAAAGAG	TTGTCAACGG	GTACCTTTGT	
AAAGTGCAAG	AAGAAAAGCT	TACAATGGTT	CTAGAAGGAA	TATTTTTCCT	CGCCGTCTTT	420
TTTCACGTTT	TTCTTTTCGA	ATGTTACCAA	GATCTTCCTT	ATAAAAAGGA	GCGGCAAGAA	
TTGATAAAG	AAATACAGAG	GTTACTGAAA	AGCCTGGTGC	CAAGATGTTT	TGGAACAATT	480
AACTATTTT	TTTATGTCTC	CAATGACTTT	TCGGACCACG	GTTCTACAAG	ACCTTGTTAA	
TTTTGGTTAA	AATGAATGGA	GCCCCACAGA	ATACAAGCCA	TGGCAGTAAA	GCACAGGAAA	540
AAAACCAATT	TTACTTACCT	CGGGGTGTCT	TATGTTTCGGT	ACCGTCATTT	CGTGTCTTTT	
TAATGAAAGA	AGCTTGCAAA	ACCTTGTTTT	TCCTCAGAAA	TATTGTACAT	GAAAAGTGTG	600
ATTACTTTCT	TCGAACGTTT	TGGAACAAAA	AGTGAGTCTT	ATAACATGTA	CTTTTGACAC	
ACAGGATGGT	GATACAGAAC	AATCTGTGCT	TTGGTAAATG	CATCTCTCTC	CATGTTCCAA	660
TGTCCTACCA	CTATGTCTTG	TTAGACACGA	AACCATTTAC	GTAGAGAGAG	GTACAAGGTT	
ATCAGCAAGA	TCGACGAAAT	ACTTGTTCCC	ATTGCTTGCC	GTCCAAATTT	ACCCTGAACC	720
TAGTCGTTCT	AGCTGCTTTA	TGAACAAGGG	TAACGAACGG	CAGGTTTAAA	TGGGACTTGG	
ACCTGACGCT	GAATTGTACT	GGATCTAAGA	ATGTAGTAAA	GGTTGTCATG	ATGGTAGAGG	780
TGGACTGCGA	CTTAACATGA	CCTAGATTCT	TACATCATTT	CCAACAGTAC	TACCATCTCC	
AATGCACGTG	TGAAGCTCAT	AAGAGCAACT	TCCACCAAAC	TGCACAGTTT	AACATGGATA	840
TTACGTGCAC	ACTTCGAGTA	TTCTCGTTGA	AGGTGGTTTG	ACGTGTCAAA	TTGTACCTAT	
CATCTACTAC	CCTGCACCAT	TAAAGGACTG	CCATACAGTA	TGGAAATGCC	CTTTTGTTGG	900
GTAGATGATG	GGACGTGGTA	ATTTCTGAC	GGTATGTCAT	ACCTTTACGG	GAAAACAACC	
AATATTTGTT	ACATACTATG	CATCTAAAGC	ATTATGTTGC	CTTCTATTTT	ATATAACCAC	960
TTATAAACAA	TGATGATAC	GTAGATTTTC	TAATACAACG	GAAGATAAAG	TATATTGGTG	
ATGGAATAAG	GATTGTATGA	ATTATAATTA	ACAAATGGCA	TTTTGTGTAA	CATGCAAGAT	1020
TACCTTATTC	CTAACATACT	TAATATTAAT	TGTTTACCGT	AAAACACATT	GTACGTTCTA	

CTCTGTTCCA TCAGTTGCAA GATAAAAGGC AATATTTGTT TGACTTTTTT TCTACAAAAT 1080  
 GAGACAAGGT AGTCAACGTT CTATTTTCCG TTATAAACAA ACTGAAAAAA AGATGTTTTA  
 GAATACCCAA ATATATGATA AGATAATGGG GTCAAACTG TTAAGGGGTA ATGTAATAAT 1140  
 CTTATGGGTT TATATACTAT TCTATTACCC CAGTTTGGAC AATCCCCAT TACATTATTA  
 AGGGACTAAG TTTGCCCAGG AGCAGTGACC CATAACAACC AATCAGCAGG TATGATTAC 1200  
 TCCCTGATTG AAACGGGTCC TCGTCACTGG GTATTGTTGG TTAGTCGTCC ATACTAAATG  
 TGGTCACCTG TTTAAAAGCA AACATCTTAT TGGTTGCTAT GGGTTACTGC TTCTGGGCAA 1260  
 ACCAGTGGAC AAATTTTCGT TTGTAGAATA ACCAACGATA CCCAATGACG AAGACCCGTT  
 AATGTGTGCC TCATAGGGGG GTTAGTGTGT TGTGTACTGA ATAAATTGTA TTTATTTTAT 1320  
 TTACACACGG AGTATCCCC CAATCACACA ACACATGACT TATTTAACAT AAATAAAGTA  
 TGTTACAAAA AAAAAAAA  
 ACAATGTTTT TTTTTTTT

Fig. 2. (Continuation page 2, SEQ ID NO:2).

MSRTRKVDL LLLAIPGLAL LLLPNAYCAS CEPVRIPMCK SMPWNMTKMP NHLHHSTQAN 60  
AILAIEQFEG LLTTECSQDL LFFLCAMYAP ICTIDFQHEP IKPCKSV CER ARAGCEPILI 120  
KYRHTWPESL ACEELPVYDR GVCISPEAIV TVEQGTDSMP DFSMDSNNGN CGSGREHCKC 180  
KPMKATQKTY LKNNYNYVIR AKVKEVKVKC HDATAIVEVK EILKSSLVNI PKDTVTLYTN 240  
SGCLCPQLVA NEEYIIMGYE DKERTLLLV EGSLAEKWRD RLAKVKRWD QKLRRPRKSK 300  
DPVAPIPNKN SNSRQARS

Figure 3. Deduced amino acid sequence of *Xenopus* frazzled protein. SEQ ID NO:3.

Figure 4. Nucleotide sequence of the full-length frazzled cDNA derived from the *Xenopus* organizer. The sense strand of the DNA on top (5' to 3' direction) and the antisense strand on the bottom line (opposite direction). SEQ ID NO:4.

```

GAATTCCTT TCACACAGGA CTCTGGCAG AGGTGAATGG TTAGCCCTAT GGATTGGTT      60
CTTAAGGGAA AGTGTGTCTT GAGGACCGTC TCCACTTACC AATCGGGATA CCTAAACCAA

TGTTGATTTT GACACATGAT TGATTGCTTT CAGATAGGAT TGAAGGACTT GGATTTTAT      120
ACAACTAAAA CTGTGTACTA ACTAACGAAA GTCTATCCTA ACTTCCTGAA CCTAAAAATA

CTAATTCGTC ACTTTTAAAT TATCTGAGTA ATTGTTTATT TTGTATTGGA TGGGACTAAA      180
GATTAAGACG TGAAAATTTA ATAGACTCAT TAACAAGTAA AACATAACCT ACCCTGATTT

GATAAACTTA ACTCCTTGCT TTTGACTTGC CCATAAACTA TAAGGTGGGG TGAGTTGTAG      240
CTATTTGAAT TGAGGAACGA AACTGAACG GGTATTTGAT ATTCCACCCC ACTCAACATC

TTGCTTTTAC ATGTGCCCAG ATTTTCCCTG TATTCCCTGT ATTCCCTCTA AAGTAAGCCT      300
AACGAAATG TACACGGGTC TAAAGGGAC ATAAGGGACA TAAGGGAGAT TTCATTGCGA

ACACATACAG GTTGGGCAGA ATAACAATGT CTCGAACAAG GAAAGTGGAC TCATTACTGC      360
TGTTGATGTC CAACCCGTCT TATTGTTACA GAGCTTGTTT CTTTCACCTG AGTAATGACG

TACTGGCCAT ACCTGGACTG GCGCTTCTCT TATTACCCAA TGCTTACTGT GCTTCGTGTG      420
ATGACCGGTA TGGACCTGAC CGCGAAGAGA ATAATGGGTT ACGAATGACA CGAAGCACAC

AGCCTGTGCG GATCCCCATG TGCAAACTTA TGCCATGGAA CATGACCAAG ATGCCCAACC      480
TCGGACACGC CTAGGGGTAC ACGTTTAGAT ACGGTACCTT GTACTGGTTC TACGGGTTGG

ATCTCCACCA CAGCACTCAA GCCAATGCCA TCCTGGCAAT TGAACAGTTT GAAGGTTTGC      540
TAGAGGTGGT GTCGTGAGTT CGGTTACGGT AGGACCGTTA ACTTGTCAAA CTTCCAAACG

TGACCACTGA ATGTAGCCAG GACCTTTTGT TCTTTCTGTG TGCCATGTAT GCCCCATT      600
ACTGGTGACT TACATCGGTC CTGGAAAACA AGAAGACAC ACGGTACATA CGGGGGTAAA

GTACCATCGA TTCCAGCAT GAACCAATTA AGCCTTGCAA GTCCGTGTGC GAAAGGGCCA      660
CATGGTAGCT AAAGGTCGTA CTTGGTTAAT TCGGAACGTT CAGGCACACG CTTTCCCGGT

GGGCCGGCTG TGAGCCCATC CTCATAAAGT ACCGGCACAC TTGGCCAGAG AGCCTGGCAT      720
CCCGGCCGAC ACTCGGGTAA GAGTATTTC TGGCCGTGTG AACCGGTCTC TCGGACCGTA

GTGAAGAGCT GCCCGTATAT GACAGAGGAG TCTGCATCTC CCCAGAGGCT ATCGTCACAG      780
CACTTCTCGA CGGGCATATA CTGTCTCCTC AGACGTAGAG GGGTCTCCGA TAGCAGTGTG

TGGAACAAGG AACAGATTCA ATGCCAGACT TCTCCATGGA TTCAAACAAT GGAAATTGCG      840
ACCTTGTTCC TTGTCTAAGT TACGGTCTGA AGAGGTACCT AAGTTTGTTA CCTTTAACGC

GAAGCGGCAG GGAGCACTGT AAATGCAAGC CCATGAAGGC AACCCAAAAG ACGTATCTCA      900
CTTCGCCGTC CCTCGTGACA TTTACGTTCC GGTACTTCCG TTGGGTTTTT TGCATAGAGT

AGAATAATTA CAATTATGTA ATCAGAGCAA AAGTGAAAGA GGTGAAAGTG AAATGCCACG      960
TCTTATTAAT GTTAATACAT TAGTCTCGTT TTCACTTTCT CCACTTTCAC TTTACGGTGC

ACGCAACAGC AATTGTGGAA GTAAAGGAGA TTCTCAAGTC TTCCCTAGTG AACATTCTTA      1020
TGCGTTGTCT TTAACACCTT CATTTCTCTT AAGAGTTTCA AAGGGATCAC TTGTAAGGAT

```

AAGACACAGT GACACTGTAC ACCAACTCAG GCTGCTTGTG CCCCAGCTT GTTGCCAATG TTCTGTGTCA CTGTGACATG TGGTTGAGTC CGACGAACAC GGGGGTCGAA CAACGGTTAC	1080
AGGAATACAT AATTATGGGC TATGAAGACA AAGAGCGTAC CAGGCTTCTA CTAGTGGAAAG TCCTTATGTA TTAATACCCG ATACTTCTGT TTCTCGCATG GTCCGAAGAT GATCACCTTC	1140
GATCCTTGGC CGAAAAATGG AGAGATCGTC TTGCTAAGAA AGTCAAGCGC TGGGATCAAA CTAGGAACCG GCTTTTTTACC TCTCTAGCAG AACGATTCTT TCAGTTCGCG ACCCTAGTTT	1200
AGCTTCGACG TCCCAGGAAA AGCAAAGACC CCGTGGGTCC AATTCCCAAC AAAACAGCA TCGAAGCTGC AGGGTCCTTT TCGTTTCTGG GGCACCGAGG TTAAGGGTTG TTTTGTCTGT	1260
ATTCCAGACA AGCGCGTAGT TAGACTAACG GAAAGGTGTA TGGAACTCT ATGGACTTTG TAAGGTCTGT TCGCGCATCA ATCTGATTGC CTTCCACAT ACCTTTGAGA TACCTGAAAC	1320
AAACTAAGAT TTGCATTGTT GGAAGAGCAA AAAAGAAATT GCACTACAGC ACGTTATATT TTTGATTCTA AACGTAACAA CCTTCTCGTT TTTTCTTTAA CGTGATGTCG TGCAATATAA	1380
CTATTGTTTA CTACAAGAAG CTGGTTTAGT TGATTGTAGT TCTCCTTTCC TTCTTTTTTT GATAACAAAT GATGTTCTTC GACCAATCA ACTAACATCA AGAGGAAAGG AAGAAAAAAA	1440
TTATAACTAT ATTTGCACGT GTTCCCAGGC AATGTTTTTA TTCAACTTCC AGTGACAGAG AATATTGATA TAAACGTGCA CAAGGGTCCG TTAACAAAT AAGTTGAAGG TCACTGTCTC	1500
CAGTGACTGA ATGTCTCAGC CTAAAGAAGC TCAATTCATT TCTGATCAAC TAATGGTGAC GTCAGTACT TACAGAGTCG GATTTCTTCG AGTTAAGTAA AGACTAGTTG ATTACCACTG	1560
AAGTGTGTTGA TACTTGGGGA AAGTGAACATA ATTGCAATGG TAAATCAGAG AAAAGTTGAC TTCACAACT ATGAACCCCT TTCACTTGAT TAACGTTACC ATTTAGTCTC TTTTCAACTG	1620
CAATGTTGCT TTTCTGTAG ATGAACAAGT GAGAGATCAC ATTTAAATGA TGATCACTTT GTTACAACGA AAAGGACATC TACTTGTTCA CTCTCTAGTG TAAATTTACT ACTAGTGAAA	1680
CCATTTAATA CTTTCAGCAG TTTTAGTTAG ATGACATGTA GGATGCACCT AAATCTAAAT GGTAAATTAT GAAAGTCGTC AAAATCAATC TACTGTACAT CCTACGTGGA TTTAGATTTA	1740
ATTTTATCAT AAATGAAGAG CTGGTTTAGA CTGTATGGTC ACTGTTGGGA AGGTAAATGC TAAATAGTA TTTACTTCTC GACCAATCT GACATACCAG TGACAACCCCT TCCATTACG	1800
CTACTTTGTC AATTCTGTTT TAAAAATTGC CTAAATAAAT ATTAAGTCCT AAATAAAAAA GATGAAACAG TTAAGACAAA ATTTTAAACG GATTTATTTA TAATTCAGGA TTTATTTTTT	1860
AAAAAAAAAA AAAAA TTTTTTTTTT TTTT	

Fig. 4. (Continuation page 2, SEQ ID NO:4).

MLLLFRAIPM LLLGLMVLQT DCEIAQYYID EEEPPGTVIA VLSQHSIFNT TDIPATNFRL	60
MKQFNNSLIG VRESQGQLSI MERIDREQIC RQSLHCNLAL DVVSFSKGHF KLLNVKVEVR	120
DINDHSPHFP SEIMHVEVSE SSSVGTRIPL EIAIDEDVGS NSIQNFQISN NSHFSIDVLT	180
RADGVKYADL VLMRELDREI QPTYIMELLA MDGGVPSLSG TAVVNIRVLD FDNNSPVFER	240
STIAVDLVED APLGYLLEL HATDDDEGVN GEIVYGFSTL ASQEVRLFK INSRTGSVTL	300
EGQVDFETKQ TYEFEVQAQD LGPNPLTATC KVTVHILDVN DNTPAITITP LTTVNAGVAY	360
IPETATKENF IALISTTDRA SGSNGQVRCT LYGHEHFKLQ QAYEDSYMIV TTSTLDRENI	420
AAYSLTVVAE DLGFPSPKTK KYITVKVSE NDNPVFSKP QYEASILENN APGSYITTVI	480
ARDSDSQNG KVNRLVDAK VMGQSLTTFV SLDADSGVLR AVRSLDYEKL KQLDFEIEAA	540
DNGIPQLSTR VQLNLRIVDQ NDNCPVITNP LLNNGSGEVL LPISAPQNYL VFQLKAEDSD	600
EGHNSQLFYT ILRDPSRLFA INKESGEVFL KKQLNSDHSE DLSIVVAVYD LGRPSLSTNA	660
TVKFILTDSF PSNVEVVILQ PSAEEQHQID MSIIFIIVLA GGCALLLLAI FVACTCKKK	720
AGEFKQVPEQ HGTCNEERLL STPSQSVSS SLSQSESCQL SINTESENCV VSSNQEQHQQ	780
TGIKHSISVP SYHTSGWHLN NCAMSSISGHS HMGHISTKVQ WAKEIVTSMT VTLILVENQK	840
RRALSSQCRH KPVLTQMNO QGSDMPITIS ATESTRVQKM GTHCNMKRA IDCLTL	

Figure 5. Deduced amino acid sequence of the *Xenopus* PAPC (paraxial protocadherin) protein. It encodes a member of the cadherin family of transmembrane proteins that has dorsalizing activity when constructs are injected into *Xenopus* embryos. SEQ ID NO:5.

Figure 6. Nucleotide sequence of the full-length PAPC cDNA derived from the *Xenopus* organizer. The sense strand of the DNA is shown in the top line (in the 5' to 3' direction), and the bottom line shows the antisense strand (opposite orientation). SEQ ID NO:6.

GAATTC	CCAG	AGATGA	ACTC	CTTGAG	ATTG	TTTTAA	TGA	CTGCAG	GTCT	GGAAGG	ATTG	60
CTTAAG	GGTC	TCTACT	TGAG	GAAC	TCTAAC	AAAATT	TACT	GACGTC	CCAGA	CCTTC	CTAAG	
ACATTG	CCAC	ACTGTT	TCTA	GGCATG	AAAA	AAC	TGCAAGT	TTCAAC	TTTG	TTTTGG	TGC	120
TGTAAC	GGTG	TGACAA	AGAT	CCGTACT	TTTT	TTGACG	TTCA	AAGTTG	AAAC	AAAA	ACCAG	
AAC	TTTGATT	CTTCAAG	ATG	CTGCTT	CTCT	TCAGAG	CCAT	TCCAAT	GC	CTGTTGGG	GAC	180
TTGAA	ACTAA	GAAGTT	CTAC	GACGA	AGAGA	AGTCTC	GGTA	AGGT	TACG	AC	ACCC	
TGATGG	TTTT	ACAAAC	CAGAC	TGTGAA	ATTG	CCCAGT	ACTA	CATAGAT	GAA	GAAGA	ACCCC	240
ACTAC	CAAAA	TGTTTG	CTG	ACACTT	TAAAC	GGGTCAT	GAT	GTATCT	ACTT	CTTCTT	GGGG	
CTGGC	ACTGT	AATTGC	AGTG	TTGTC	CACAAC	ACTCCAT	ATT	TAAC	ACTACA	GATATA	CCCTG	300
GACCGT	GACA	TTAACG	TCAC	AACAGT	GTTG	TGAGGT	TATAA	ATTGTG	ATGT	CTATAT	GGAC	
CAACCA	ATTT	CCGTCT	AAATG	AAGCA	ATTTA	ATAATT	CCCT	TATCGG	AGTC	CGTGAG	AGTG	360
GTTGGT	TAAA	GGCAG	ATTAC	TTCGT	TAAAT	TATTA	AGGGA	ATAGCC	TCAG	GCACTC	TCAC	
ATGGG	CAGCT	GAGCAT	CATG	GAGAG	GATTG	ACCGGG	GAGCA	AATCTG	CAGG	CAGTCC	CTTC	420
TACCCG	TCGA	CTCGTA	GTAC	CTCTC	CTAAC	TGGCC	CTCGT	TTAGAC	GTCC	GTCAGG	GAA	
ACTGCA	ACCT	GGCTTT	GGAT	GTGGT	CAGCT	TTTCCA	AAAG	ACACTT	CAAG	CTTCTG	AAAG	480
TGACGT	TGGA	CCGAAA	ACCTA	CACCAG	TCGA	AAAGG	TTTCC	TGTGA	AGTT	GAAG	ACTG	
TGAAAG	TGGA	GGTGAG	AGAC	ATTAAT	GACC	ATAGCC	CCTCA	CTTTCC	CAGT	GAAATA	ATGC	540
ACTTTC	ACCT	CCACTC	CTCTG	TAATT	ACTGG	TATCGG	GAGT	GAAAGG	GTC	CTTTAT	TACG	
ATGTG	GAGGT	GTCTG	AAAGT	TCCTC	TGTGG	GCACC	AGGAT	TCCTTT	AGAA	ATTGCA	ATAG	600
TACAC	CTCA	CAGACT	TTCA	AGGAG	ACACC	CGTGG	CTCA	AGGAA	ATCTT	TAACG	TATC	
ATGAAG	ATGT	TGGGT	CCAAC	TCCAT	CCAGA	ACTTTC	CAGAT	CTCAA	ATAAT	AGCC	ACTTCA	660
TACTT	CTACA	ACCCAG	GTTG	AGGTAG	GTCT	TGAAAG	TCTA	GAGTT	TATTA	TCGGT	GAAGT	
GCATTG	ATGT	GCTAAC	CCAGA	GCAGAT	GGGG	TGAAAT	ATGC	AGATT	TAGTC	TTAATG	AGAG	720
CGTAA	CTACA	CGATTG	GTCT	CGTCT	ACCCC	ACTTTA	TACG	TCTAA	ATCAG	AATTAC	TCTC	
AACTGG	ACAG	GGAAAT	CCAG	CCAAC	ATACA	TAATGG	AGCT	ACTAG	CAATG	GATGGG	GGTG	780
TTGAC	CTGC	CCTTTA	GGTC	GGTTG	TATGT	ATTAC	CTCA	TGATC	GTAC	CTACCC	CCAC	
TACCAT	CACT	ATCTGG	TACT	GCAGT	GGTTA	ACATCC	GAGT	CCTGG	ACTTT	AATGAT	AACA	840
ATGGT	AGTGA	TAGAC	CATGA	CGTCA	CCAAT	TGTAGG	CTCA	GGAC	CTGAAA	TTACTA	TGT	
GCCCAG	TGTT	TGAGAG	AAGC	ACCATT	GCTG	TGGAC	CTAGT	AGAGG	ATGCT	CCTCTG	GGAT	900
CGGGT	CACAA	ACTCT	CTTCG	TGGTA	ACGAC	ACCTG	GATCA	TCTC	CTACGA	GGAGAC	CCTA	
ACCTTT	TGTT	GGAGT	TACAT	GCTACT	GACG	ATGATG	AAGG	AGTGA	ATGGA	GAAATT	TGTT	960
TGGAA	ACAA	CCTCA	ATGTA	CGATG	ACTGC	TACTAC	TCC	TACTT	ACCT	CTTTA	ACAAA	
ATGGAT	TACAG	CACTTT	GGCA	TCTCA	AGAGG	TACGTC	AGCT	ATTTAA	AAT	AATCC	AGAA	1020
TACCTA	AGTC	GTGAA	ACCGT	AGAGT	TCTCC	ATGCAG	TCGA	TAAAT	TTTTAA	TTGAGG	TCTT	

CTGGCAGTGT TACTCTTGAA GGCCAAGTTG ATTTTGAGAC CAAGCAGACT TACGAATTTG 1080  
 GACCGTCACA ATGAGAACTT CCGGTTCAAC TAAAACTCTG GTTCGTCTGA ATGCTTAAAC  
 AGGTACAAGC CCAAGATTG GGCCCCAACC CACTGACTGC TACTTGTAAG GTAACGTGTC 1140  
 TCCATGTTG GGTCTAAAC CCGGGGTGG GTGACTGACG ATGAACATTT CATTGACAAG  
 ATATACTTGA TGTAATGAT AATACCCAG CCATCACTAT TACCCCTCTG ACTACTGTAA 1200  
 TATATGAAC ACATTTACTA TTATGGGTC GGTAGTGATA ATGGGAGAC TGATGACATT  
 ATGCAGGAGT TGCCTATATT CCAGAAACAG CCACAAAGGA GAACTTTATA GCTCTGATCA 1260  
 TACGTCCTCA ACGGATATAA GGTCTTTGTC GGTGTTTCCT CTTGAAATAT CGAGACTAGT  
 GCACTACTGA CAGAGCCTCT GGATCTAATG GACAAGTTCG CTGTACTCTT TATGGACATG 1320  
 CGTGATGACT GTCTCGGAGA CCTAGATTAC CTGTTCAAGC GACATGAGAA ATACCTGTAC  
 AGCACTTTAA ACTACAGCAA GCTTATGAGG ACAGTTACAT GATAGTTACC ACCTCTACTT 1380  
 TCGTGAAATT TGATGTCGTT CGAATACTCC TGTCATGTA CTATCAATGG TGGAGATGAA  
 TAGACAGGGA AAACATAGCA GCGTACTCTT TGACAGTAGT TGCAGAAGAC CTTGGCTTCC 1440  
 ATCTGTCCCT TTTGTATCGT CGCATGAGAA ACTGTCATCA ACGTCTTCTG GAACCGAAGG  
 CCTCATTGAA GACCAAAAAG TACTACACAG TCAAGGTTAG TGATGAGAAT GACAATGCAC 1500  
 GGAGTAACTT CTGGTTTTTC ATGATGTGTC AGTTCCAATC ACTACTCTTA CTGTTACGTG  
 CTGTATTTTC TAAACCCAG TATGAAGCTT CTATTCTGGA AAATAATGCT CCAGGCTCTT 1560  
 GACATAAAG ATTTGGGGTC ATACTTCGAA GATAAGACCT TTTATTACGA GGTCCGAGAA  
 ATATAACTAC AGTGATAGCC AGAGACTCTG ATAGTGATCA AAATGGCAA GTAAATTACA 1620  
 TATATTGATG TCACTATCGG TCTCTGAGAC TATCACTAGT TTTACCGTTT CATTTAATGT  
 GACTTGTGGA TGCAAAAGTG ATGGGCCAGT CACTAACAAAC ATTTGTTTCT CTTGATGCGG 1680  
 CTGAACACCT ACGTTTTTAC TACCCGGTCA GTGATTGTTG TAAACAAAGA GAACTACGCC  
 ACTCTGGAGT ATTGAGAGCT GTTAGGTCTT TAGACTATGA AAAACTTAA CAACTGGATT 1740  
 TGAGACCTCA TAACTCTCGA CAATCCAGAA ATCTGATACT TTTTGAAAT GTTGACCTAA  
 TTGAAATTGA AGCTGCAGAC AATGGGATCC CTCAACTCTC CACTCGCGTT CAACTAAATC 1800  
 AACTTTAACT TCGACGCTG TTACCCTAGG GAGTTGAGAG GTGAGCGCAA GTTGATTAG  
 TCAGAATAGT TGATCAAAAT GATAATTGCC CTGTGATAAC TAATCCTCTT CTTAATAATG 1860  
 AGTCTTATCA ACTAGTTTTA CTATTAACGG GACACTATTG ATTAGGAGAA GAATTATTAC  
 GCTCGGGTGA AGTTCTGCTT CCCATCAGCG CTCCTCAAAA CTATTTAGTT TTCCAGCTCA 1920  
 CGAGCCCACT TCAAGACGAA GGGTAGTCGC GAGGAGTTT GATAAATCAA AAGGTCGAGT  
 AAGCCGAGGA TTCAGATGAA GGGCACAAC CCCAGCTGTT CTATACCATA CTGAGAGATC 1980  
 TTCGGCTCCT AAGTCTACTT CCCGTGTTGA GGGTCGACAA GATATGGTAT GACTCTCTAG  
 CAAGCAGATT GTTTGCCATT AACAAAGAAA GTGGTGAAGT GTTCCTGAAA AAACAATTAA 2040  
 GTTCGTCTAA CAAACGGTAA TTGTTTCTTT CACCACTTCA CAAGGACTTT TTTGTTAATT  
 ACTCTGACCA TTCAGAGGAC TTGAGCATAG TAGTTGCAGT GTATGACTTG GGAAGACCTT 2100  
 TGAGACTGGT AAGTCTCCTG AACTCGTATC ATCAACGTCA CATACTGAAC CCTTCTGGAA  
 CATTATCCAC CAATGCTACA GTTAAATTCA TCCTCACCAG CTCTTTTCCT TCTAACGTTG 2160  
 GTAATAGGTG GTTACGATGT CAATTTAAGT AGGAGTGGCT GAGAAAAGGA AGATTGCAAC

Fig. 6. (Continuation page 2, SEQ ID NO:6).

AAGTCGTTAT TTTGCAACCA TCTGCAGAAG AGCAGCACCA GATCGATATG TCCATTATAT 2220  
TTCAGCAATA AAACGTTGGT AGACGTCTTC TCGTCGTGGT CTAGCTATAC AGGTAATATA  
TCATTGCAGT GCTGGCTGGT GGTGTGTGCTT TGCTACTTTT GGCCATCTTT TTTGTGGCCT 2280  
AGTAACGTCA CGACCGACCA CCAACACGAA ACGATGAAAA CCGGTAGAAA AAACACCGGA  
GTACTTGTA AAAGAAAGCT GGTGAATTTA AGCAGGTACC TGAACAACAC GGAACATGCA 2340  
CATGAACATT TTTCTTTTGA CCACTTAAAT TCGTCCATGG ACTTGTGTG CCTGTACGT  
ATGAAGAAGC CCTGTTAAGC ACCCATCTC CCCAGTCGGT CTCTTCTTCT TTGTCTCAGT 2400  
TACTTCTTGC GGACAATTCG TGGGGTAGAG GGGTCAGCCA GAGAAGAAGA AACAGAGTCA  
CTGAGTCATG CCAACTCTCC ATCAATACTG AATCTGAGAA TTGCAGCGTG TCCTCTAACC 2460  
GACTCAGTAC GGTGAGAGG TAGTTATGAC TTAGACTCTT AACGTCGCAC AGGAGATTGG  
AAGAGCAGCA TCAGCAAACA GGCATAAAGC ACTCCATCTC TGTACCATCT TATCACACAT 2520  
TTCTCGTCGT AGTCGTTTGT CCGTATTTTG TGAGGTAGAG ACATGGTAGA ATAGTGTGTA  
CTGGTTGGCA CCTGGACAAT TGTGCAATGA GCATAAGTGG ACATTCTCAC ATGGGGCACA 2580  
GACCAACCGT GGACCTGTTA ACACGTTACT CGTATTCACC TGTAAGAGTG TACCCCGTGT  
TTAGTACAAA GGTACAGTGG GCAAAGGAGA TAGTGACTTC AATGACAGTG ACTCTGATAC 2640  
AATCATGTTT CCATGTCACC CGTTTCTCT ATCACTGAAG TTACTGTCAC TGAGACTATG  
TAGTGGAGAA TCAGAAAAGA AGAGCATTGA GCAGCCAATG CAGGCACAAG CCAGTGCTCA 2700  
ATCACCTCTT AGTCTTTTCT TCTCGTAACT CGTCGGTTAC GTCCGTGTTT GGTACAGT  
ATACACAGAT GAATCAGCAG GGTCCGACA TGCCGATAAC TATTCAGCC ACCGAATCAA 2760  
TATGTGTCTA CTTAGTCGTC CCAAGGCTGT ACGGCTATTG ATAAAGTCGG TGGCTTAGTT  
CAAGGGTCCA GAAATGGGA ACTGCACATT GCAATATGAA AAGGGCTATA GACTGTCTTA 2820  
GTTCCAGGT CTTTACCCT TGACGTGTAA CGTTATACTT TTCCCGATAT CTGACAGAAT  
CTCTGTAGCT CCTGTATATT ACAATACCTA CCATGCAAGA ATGCCTAACC TGCACATACC 2880  
GAGACATCGA GGACATATAA TGTTATGGAT GGTACGTTCT TACGGATTGG ACGTGTATGG  
GAACCATACC CTTAGAGACC CTTATTACCA TATCAATAAT CCTGTTGCTA ATCGGATGCA 2940  
CTTGGTATGG GAATCTCTGG GAATAATGGT ATAGTTATTA GGACAACGAT TAGCCTACGT  
GGCGGAATAT GAAAGAGATT TAGTCAACAG AAGTGCAACG TTATCTCCGC AGAGATCGTC 3000  
CCGCTTATA CTTTCTCTAA ATCAGTTGTC TTCAGTTGC AATAGAGGCG TCTCTAGCAG  
TAGCAGATAC CAAGAATTCA ATTACAGTCC GCAGATATCA AGACAGCTTC ATCCTTCAGA 3060  
ATCGTCTATG GTTCTTAAGT TAATGTCAGG CGTCTATAGT TCTGTGCAAG TAGGAAGTCT  
AATTGCTACA ACCTTTTAAT CATTAGGCAT GCAAGTGAGA ATGCACAAAG GCAAGTGCTT 3120  
TTAOCGATGT TGGAAAATTA GTAATCCGTA CGTTCACTCT TACGTGTTT CATTACAGAA  
TAGCATGAAA GCTAAATATA TGGAGTCTCC CTTTCCCTC TGATGGATGG GGGGAGACAC 3180  
ATCGTACTTT CGATTTATAT ACCTCAGAGG GGAAAGGGAG ACTACCTACC CCCCTCTGTG  
AGGACAGTGC ATAAATATAC AGCTGCTTTC TATTGCAAT TCACTTGGGA ATTTTGTGTT 3240  
TCCTGTCACG TATTATATG TCGACGAAAG ATAAACGTAA AGTGAAACCT TAAAAACAA  
TTTTTACAT ATTTATTTT CCTGAATTGA ATGTGACATT GTCCTGTCAC CTAACAGCA 3300  
AAAAATGTA TAAATAAAAA GGACTTAACT TACACTGTAA CAGGACAGTG GATTGATCGT

Fig. 6. (Continuation page 3, SEQ ID NO:6).

ATTAAATCCA CAGACCTACA GTCAAATATT TGAGGGCCCC TGAAACAGCA CATCAGTCAG	3360
TAATTTAGGT GTCTGGATGT CAGTTTATAA ACTCCCGGGG ACTTTGTCGT GTAGTCAGTC	
GACCTAAAGT GGCCTTTTTA CTTTTCAGC CTCCTGGGTC TGCCCTCTGT GTTAATCAGC	3420
CTGGATTTC ACGGAAAAAT GAAAATCGTC GAGGACCCAG ACGGGAGACA CAATTAGTCG	
CCCTGGTCAA GTCCTGAGTA GGATCATGGC GTTTTTATAT GCATCTCACC TACTTTGGAC	3480
GGGACCAGTT CAGGACTCAT CCTAGTACCG CAAAAATATA CGTAGAGTGG ATGAAACCTG	
GTGATTTACA CATAATAGGA AACGCTTGGT TTCAGTGAAG TCTGTGTTGT ATATATTCTG	3540
CACTAAATGT GTATTATCCT TTGCGAACCA AAGTCACTTC AGACACAACA TATATAAGAC	
TTATATACAC GCATTTTGTG TTTGTGTATA TATTTCAAGT CCATTCAGAT ATGTGTATAT	3600
AATATATGTG CGTAAACAC AAACACATAT ATAAAGTTCA GGTAAGTCTA TACACATATA	
AGTGCAGACC TTGTAAATTA AATATTCTGA TACTTTTCC TCAATAAATA TTAAAT	
TCACGTCTGG AACATTTAAT TTATAAGACT ATGAAAAAGG AGTTATTAT AAATTTA	

Fig. 6. (Continuation page 4, SEQ ID NO:6).

MVCCGPGRML LGWAGLLVLA ALCLLQVPGA QAAACEPVRI PLCKSLPWNM TKMPNHLHHS	60
TQANAILAME QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE	120
PILIKYRHSW PESLACDELP VYDRGVCISP EAIVTADGAD FPMDSSTGHC RGASSERCKC	180
KPVRATQKTY FRNNYNYVIR AKVKEVKMKC HDVTAVVEVK EILKASLVNI PRDTVNLYTT	240
SGCLCPPLTV NEEYVIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLGK	300
TDASDSTQNQ KSGRNSNPRP ARS.	

Figure 7. Deduced amino acid sequence of mouse FRZB-1 protein. SEQ ID NO:7.

Figure 8. Nucleotide sequence of the full-length mouse FRZB-1 cDNA. SEQ ID NO:8.

AAGCCTGGGA CCATGGTCTG CTGCGGCCCG GGACGGATGC TGCTAGGATG GGCCGGGTTG	60
TTCCGACCCT GGTACCAGAC GACGCCGGGC CCTGCCTACG ACGATCCTAC CCGGCCCAAC	
CTAGTCCTGG CTGCTCTCTG CCTGCTCCAG GTGCCCGGAG CTCAGGCTGC AGCCTGTGAG	120
GATCAGGACC GACGAGAGAC GGACGAGGTC CACGGGCCTC GAGTCCGACG TCGGACACTC	
CCTGTCCGCA TCCCGCTGTG CAAGTCCCTT CCCTGGAACA TGACCAAGAT GCCCAACCAC	180
GGACAGGCGT AGGGCGACAC GTTCAGGGAA GGGACCTTGT ACTGGTTCTA CGGGTGCGTG	
CTGCACCACA GCACCCAGGC TAACGCCATC CTGGCCATGG AACAGTTCGA AGGGCTGCTG	240
GACGTGGTGT CGTGGGTCCG ATTGCGGTAG GACCGGTACC TTGTCAAGCT TCCCACGAC	
GGCACCCTACT GCAGCCCGGA TCTTCTCTTC TTCCTCTGTG CAATGTACGC ACCCATTTGC	300
CCGTGGGTGA CGTCGGGCCT AGAAGAGAAG AAGGAGACAC GTTACATGCG TGGGTAAACG	
ACCATCGACT TCCAGCACGA GCCCATCAAG CCCTGCAAGT CTGTGTGTGA GCGCGCCCGA	360
TGGTAGCTGA AGGTCGTGCT CGGGTAGTTC GGGACGTTCA GACACACACT CGCGCGGGCT	
CAGGGCTGCG AGCCCATTTCT CATCAAGTAC CGCCACTCGT GGCCGGAAAG CTTGGCCTGC	420
GTCCCACGCG TCGGGTAAGA GTAGTTTCATG GCGGTGAGCA CCGGCCTTTC GAACCGGACG	
GACGAGCTGC CGGTGTACGA CCGCGGCGTG TGCATCTCTC CTGAGGCCAT CGTCACCGCG	480
CTGCTCGACG GCCACATGCT GGCGCCGCAC ACGTAGAGAG GACTCCGGTA GCAGTGGCGC	
GACGGAGCGG ATTTTCCTAT GGATTCAAGT ACTGGACACT GCAGAGGGGC AAGCAGCGAA	540
CTGCCTCGCC TAAAAGGATA CCTAAGTTCA TGACCTGTGA CGTCTCCCCG TTCGTCGCTT	
CGTTGCAAAT GTAAGCCTGT CAGAGCTACA CAGAAGACCT ATTTCCGGAA CAATTACAAC	600
GCAACGTTTA CATTCCGACA GTCTCGATGT GTCTTCTGGA TAAAGGCCTT GTTAATGTTG	
TATGTCATCC GGGCTAAAGT TAAAGAGGTA AAGATGAAAT GTCATGATGT GACCGCCGTT	660
ATACAGTAGG CCGGATTTCA ATTTCTCCAT TTCTACTTTA CAGTACTACA CTGGCGGCAA	
GTGGAAGTGA AGGAAATTCT AAAGGCATCA CTGGTAAACA TTCCAAGGGA CACCGTCAAT	720
CACCTTCACT TCCTTTAAGA TTCCGTAGT GACCATTGTG AAGGTTCCCT GTGGCAGTTA	
CTTTATACCA CCTCTGGCTG CCTCTGTCCT CCACTTACTG TCAATGAGGA ATATGTCATC	780
GAAATATGGT GGAGACCGAC GGAGACAGGA GGTGAATGAC AGTTACTCCT TATACAGTAG	
ATGGGCTATG AAGACGAGGA ACGTTCAGG TTACTCTTGG TAGAAGGCTC TATAGCTGAG	840
TACCCGATAC TTCTGCTCCT TGCAAGGTCC AATGAGAACC ATCTTCCGAG ATATCGACTC	
AAGTGGAAGG ATCGGCTTGG TAAGAAAGTC AAGCGCTGGG ATATGAAACT CCGACACCTT	900
TTCACCTTCC TAGCCGAACC ATTCTTTCAG TTCGCGACCC TATACTTTGA GGCTGTGGAA	
GGACTGGGTA AACTGATGC TAGCGATTCC ACTCAGAATC AGAAGTCTGG CAGGAAGTCT	960
CCTGACCCAT TTGACTACG ATCGCTAAGG TGAGTCTTAG TCTTCAGACC GTCCTTGAGA	

AATCCCCGGC CAGCACGCAG CTAAATCCTG AAATGTAAAA GGCCACACCC ACGGACTCCC	1020
TTAGGGGGCCG GTCGTGCGTC GATTTAGGAC TTTACATTTT CCGGTGTGGG TGCCTGAGGG	
TTCTAAGACT GGCGCTGGTG GACTAACAAA GGAAAACCGC ACAGTTGTGC TCGTGACCGA	1080
AAGATTCTGA CCGCGACCAC CTGATTGTTT CCTTTTGGCG TGTCAACACG AGCACTGGCT	
TTGTTTACCG CAGACACCGC GTGGCTACCG AAGTTACTTC CGGTCCCCTT TCTCCTGCTT	1140
AACAAATGGC GTCTGTGGCG CACCGATGGC TTCAATGAAG GCCAGGGGAA AGAGGACGAA	
CTTAATGGCG TGGGGTTAGA TCCTTTAATA TGTATATAT TCTGTTTCAT CAATCACGTG	1200
GAATTACCGC ACCCCAATCT AGGAAATTAT ACAATATATA AGACAAAGTA GTTAGTGAC	
GGGACTGTTC TTTTGCAACC AGAATAGTAA ATTAAATATG TTGATGCTAA GGTTCCTGTA	1260
CCCTGACAAG AAAACGTTGG TCTTATCATT TAATTTATAC AACTACGATT CCAAAGACAT	
CTGGACTCCC TGGGTTTAAT TTGGTGTCT GTACCCTGAT TGAGAATGCA ATGTTTCATG	1320
GACCTGAGGG ACCCAAATTA AACCACAAGA CATGGGACTA ACTCTTACGT TACAAAGTAC	
TAAAGAGAGA ATCCTGGTCA TATCTCAAGA ACTAGATATT GCTGTAAGAC AGCCTCTGCT	1380
ATTTCTCTCT TAGGACCAGT ATAGAGTTCT TGATCTATAA CGACATTCTG TCGGAGACGA	
GCTGCGCTTA TAGTCTTGTG TTTGTATGCC TTTGTCCATT TCCCTCATGC TGTGAAAGTT	1440
CGACGCGAAT ATCAGAACAC AAACATACGG AAACAGGTAA AGGGAGTACG ACACTTTCAA	
ATACATGTTT ATAAAGGTAG AACGGCATTT TGAAATCAGA CACTGCACAA GCAGAGTAGC	1500
TATGTACAAA TATTTCCATC TTGCCGTAAA ACTTTAGTCT GTGACGTGTT CGTCTCATCG	
CCAACACCAG GAAGCATTTA TGAGGAAACG CCACACAGCA TGACTTATTT TCAAGATTGG	1560
GGTTGTGGTC CTTCGTAAAT ACTCCTTGC GGTGTGTCGT ACTGAATAAA AGTTCTAACC	
CAGGCAGCAA AATAAATAGT GTTGGGAGCC AAGAAAAGAA TATTTTGCCT GGTAAAGGGG	1620
GTCCGTCGTT TTATTTATCA CAACCCTCGG TTCTTTTCTT ATAAAACGGA CCAATTCCCC	
CACACTGGAA TCAGTAGCCC TTGAGCCATT AACAGCAGTG TTCTTCTGGC AAGTTTTTGA	1680
GTGTGACCTT AGTCATCGGG AACTCGGTAA TTGTCGTCAC AAGAAGACCG TTCAAAAAC	
TTGTTTCATA AATGTATTCA CGAGCATTAG AGATGAACTT ATAAC TAGAC ATCTGTTGTT	1740
AAACAAGTAT TTACATAAGT GTCGTAATC TCTACTTGAA TATTGATCTG TAGACAACAA	
ATCTCTATAG CTCTGCTTCC TTCTAAATCA AACCCATTGT TGGATGCTCC CTCTCCATTC	1800
TAGAGATATC GAGACGAAGG AAGATTTAGT TTGGGTAACA ACCTACGAGG GAGAGGTAAG	

ATAAATAAAT	TTGGCTTGCT	GTATTGGCCA	GGAAAAGAAA	GTATTAAAGT	ATGCATGCAT	1860
TATTTATTTA	AACCGAACGA	CATAACCGGT	CCTTTTCTTT	CATAATTTCA	TACGTACGTA	
GTGCACCAGG	GTGTTATTTA	ACAGAGGTAT	GTAACCTCTAT	AAAAGACTAT	AATTTACAGG	1920
CACGTGGTCC	CACAATAAAT	TGTCTCCATA	CATTGAGATA	TTTTCTGATA	TTAAATGTCC	
ACACGGAAAT	GTGCACATTT	GTTTACTTTT	TTTCTTCCTT	TTGCTTTGGG	CTTGTGATTT	1980
TGTGCCTTTA	CACGTGTAAA	CAAATGAAAA	AAAGAAGGAA	AACGAAACCC	GAACACTAAA	
TGGTTTTTGG	TGTGTTTATG	TCTGTATTTT	GGGGGGTGGG	TAGGTTTAAG	CCATTGCACA	2040
ACCAAAAACC	ACACAAATAC	AGACATAAAA	CCCCCACC	ATCCAAATTC	GGTAACGTGT	
TTCAAGTTGA	ACTAGATTAG	AGTAGACTAG	GCTCATTGGC	CTAGACATTA	TGATTTGAAT	2100
AAGTTCAACT	TGATCTAATC	TCATCTGATC	CGAGTAACCG	GATCTGTAAT	ACTAAACTTA	
TTGTGTTGTT	TAATGCTCCA	TCAAGATGTC	TAATAAAAGG	AATATGGTTG	TCAACAGAGA	2160
AACACAACAA	ATTACGAGGT	AGTTCTACAG	ATTATTTTCC	TTATACCAAC	AGTTGTCTCT	
CGACAACAAC	AACAAA					
GCTGTTGTTG	TTGTTT					

MVCGSPGGML LLRAGLLALA ALCLLRVPGA RAAACEPVRI PLCKSLPWNM TKMPNHLHHS 60  
TQANAILAIE QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE 120  
PILIKYRHSW PENLACEELP VYDRGVCISP EAIVTADGAD FPMDSNGNC RGASSERCKC 180  
KPIRATQKTY FRNNYNYVIR AKVKEIKTKC HDVTAVVEVK EILKSSLVNI PRDTVNLYTS 240  
SGCLCPPLNV NEEYIIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLSK 300  
SDSSNSDSTQ SQKSGRNSNP RQARN.

Figure 9. Deduced amino acid sequence of human FRZB-1 protein. SEQ ID NO:9.

**Figure 10.** Nucleotide sequence of the full-length human FRZB-1 cDNA. SEQ ID NO:10.  
This sequence was assembled from public ESTs from the Genbank database  
(accession numbers: H18848, R63748, W38677, W44760, H38379 and N71244).

```

GGCGGAGCGG GCCTTTTGGC GTCCACTGCG CGGCTGCACC CTGCCCCATC TGCCGGGATC      60
CCGCCTCGCC CGGAAAACCG CAGGTGACGC GCCGACGTGG GACGGGGTAG ACGGCCCTAG

ATGGTCTGCG GCAGCCCCGGG AGGGATGCTG CTGCTGCGGG CCGGGCTGCT TGCCCTGGCT      120
TACCAGACGC CGTCGGGCCC TCCCTACGAC GACGACGCCC GGCCCCGACGA ACGGGACCGA

GCTCTCTGCC TGCTCCGGGT GCCCGGGGCT CGGGCTGCAG CCTGTGAGCC CGTCCGCATC      180
CGAGAGACGG ACGAGGCCCA CGGGCCCCGA GCCCGACGTC GGACACTCGG GCAGGCGTAG

CCCCTGTGCA AGTCCCTGCC CTGGAACATG ACTAAGATGC CCAACCACCT GCACCACAGC      240
GGGACACGT TCAGGGACGG GACCTTGATC TGATTCTACG GGTGGGTGGA CGTGGTGTCTG

ACTCAGGCCA ACGCCATCCT GGCCATCGAG CAGTTCGAAG GTCTGCTGGG CACCCACTGC      300
TGAGTCCGGT TGCGGTAGGA CCGGTAGCTC GTCAAGCTTC CAGACGACCC GTGGGTGACG

AGCCCCGATC TGCTCTTCTT CCTCTGTGCC ATGTACGCGC CCATCTGCAC CATTGACTTC      360
TCGGGGCTAG ACGAGAAGAA GGAGACACGG TACATGCGCG GGTAGACGTG GTAAGTGAAG

CAGCACGAGC CCATCAAGCC CTGTAAGTCT GTGTGCGAGC GGGCCCGGCA GGGCTGTGAG      420
GTCGTGCTCG GGTAGTTCGG GACATTGAGA CACACGCTCG CCCGGGCCGT CCCGACACTC

CCCATACTCA TCAAGTACCG CCACTCGTGG CCGGAGAACC TGGCCTGCGA GGAGCTGCCA      480
GGGTATGAGT AGTTCATGGC GGTGAGCACC GGCCTCTTGG ACCGGACGCT CCTCGACGGT

GTGTACGACA GGGGCGTGTG CATCTCTCCC GAGGCCATCG TTAAGTGGGA CGGAGCTGAT      540
CACATGCTGT CCCCACACAC GTAGAGAGGG CTCCGGTAGC AATGACGCCT GCCTCGACTA

TTTCCTATGG ATTCTAGTAA CGGAACTGT AGAGGGGCAA GCAGTGAACG CTGTAAATGT      600
AAAGGATACC TAAGATCATT GCCTTTGACA TCTCCCGTTT CGTCACTTGC GACATTTACA

AAGCCTATTA GAGCTACACA GAAGACCTAT TTCCGGAACA ATTACAATA TGTCATTTCGG      660
TTCGGATAAT CTCGATGTGT CTTCTGGATA AAGGCCTTGT TAATGTTGAT ACAGTAAGCC

GCTAAAGTTA AAGAGATAAA GACTAAGTGC CATGATGTGA CTGCAGTAGT GGAGGTGAAG      720
CGATTTCAAT TTCTCTATTT CTGATTCACG GTACTACACT GACGTCATCA CCTCCACTTC

GAGATTCTAA AGTCCTCTCT GGTAAACATT CCACGGGACA CTGTCAACCT CTATACCAGC      780
CTCTAAGATT TCAGGAGAGA CCATTTGTAA GGTGCCCTGT GACAGTTGGA GATATGGTCC

TCTGGCTGCC TCTGCCCTCC ACTTAATGTT AATGAGGAAT ATATCATCAT GGGCTATGAA      840
AGACCGACGG AGACGGGAGG TGAATTACAA TTAATCCTTA TATAGTAGTA CCCGATACTT

```

GATGAGGAAC GTTCCAGATT ACTCTTGGTG GAAGGCTCTA TAGCTGAGAA GTGGAAGGAT 900  
 CTACTCCTTG CAAGGTCTAA TGAGAACCAC CTTCCGAGAT ATCGACTCTT CACCTTCCTA  
 CGACTCGGTA AAAAAGTTAA GCGCTGGGAT ATGAAGCTTC GTCATCTTGG ACTCAGTAAA 960  
 GCTGAGCCAT TTTTCAATT CGCGACCCTA TACTTCGAAG CAGTAGAACC TGAGTCATTT  
 AGTGATTCTA GCAATAGTGA TTCCACTCAG AGTCAGAAGT CTGGCAGGAA CTCGAACCCC 1020  
 TCACTAAGAT CGTTATCACT AAGGTGAGTC TCAGTCTTCA GACCGTCCTT GAGCTTGGGG  
 CGGCAAGCAC GCAACTAAAT CCCGAAATAC AAAAAGTAAC ACAGTGGACT TCCTATTAAG 1080  
 GCCGTTCGTG CGTTGATTTA GGGCTTTATG TTTTTCATTG TGTCACTGA AGGATAATTC  
 ACTTACTTGC ATTGCTGGAC TAGCAAAGGA AAATTGCACT ATTGCACATC ATATTCTATT 1140  
 TGAATGAACG TAACGACCTG ATCGTTTCCT TTTAACGTGA TAACGTGTAG TATAAGATAA  
 GTTTACTATA AAAATCATGT GATAACTGAT TATTACTTCT GTTCTCTTTT TGGTTTCTGC 1200  
 CAAATGATAT TTTTAGTACA CTATTGACTA ATAATGAAGA CAAAGAGAAA ACCAAAGACG  
 TTCTCTCTTC TCTCAACCCC TTTGTAATGG TTTGGGGGCA GACTCTTAAG TATATTGTGA 1260  
 AAGAGAGAAG AGAGTTGGGG AAACATTACC AAACCCCGT CTGAGAATTTC ATATAACACT  
 GTTTTCTATT TCACTAATCA TGAGAAAAAC TGTCTTTTGG CAATAATAAT AAATTAAACA 1320  
 CAAAAGATAA AGTGATTAGT ACTCTTTTGG ACAAGAAAAC GTTATTATTA TTTAATTTGT  
 TGCTGTTACC AGAGCCTCTT TGCTGAGTCT CCAGATGTGA ATTTACTTTC TGCACCCCAA 1380  
 ACGACAATGG TCTCGGAGAA ACGACTCAGA GGTCTACAAT TAAATGAAAG ACGTGGGGTT  
 TTGGGAATGC AATATTGGAT GAAAAGAGAG GTTCTGGTA TTCACAGAAA GCTAGATATG 1440  
 AACCTTACG TTATAACCTA CTTTCTCTC CAAAGACCAT AAGTGTCTTT CGATCTATAC  
 CCTTAAAAACA TACTCTGCCG ATCTAATTAC AGCCTTATTT TTGTATGCCT TTTGGGCATT 1500  
 GGAATTTTGT ATGAGACGGC TAGATTAATG TCGGAATAAA AACATACGGA AAACCCGTAA  
 CTCCTCATGC TTAGAAAGTT CCAAATGTTT ATAAAGGTAA AATGGCAGTT TGAAGTCAAA 1560  
 GAGGAGTACG AATCTTTCAA GGTTCACAAA TATTTCCATT TTACCGTCAA ACTTCAGTTT  
 TGTCACATAG GCAAAGCAAT CAAGCACCAG GAAGTGTTTA TGAGGAAACA ACACCCAAGA 1620  
 ACAGTGTATC CGTTTCGTGA GTTCGTGGTC CTTACAAAT ACTCCTTTGT TGTGGGTCT  
 TGAATTATTT TTGAGACTGT CAGGAAGTAA AATAAATAGG AGCTTAAGAA AGAACATTTT 1680  
 ACTTAATAAA AACTCTGACA GTCCTTCATT TTATTTATCC TCGAATTCTT TCTTGTAATA  
 GCCTGATTGA GAAGCACAAC TGAAACCACT AGCCGCTGGG GTGTTAATGG TAGCATCTTT 1740  
 CGGACTAACT CTTCTGTGTT ACTTTGGTCA TCGGCGACCC CACAATTACC ATCGTAAGAA  
 CTTTGGCAA TACATTTGAT TTGTTTATGA ATATATTAAT CAGCATTAGA GAAATGAATT 1800  
 GAAAACCGTT ATGTAAACTA AACAAGTACT TATATAATTA GTCGTAATCT CTTTACTTAA  
 ATAAC TAGAC ATCTGCTGTT ATCACCATAG TTTGTTTAA TTGCTTCCT TTAAATAAA 1860  
 TATTGATCTG TAGACGACAA TAGTGGTATC AAAACAAATT AAACGAAGGA AAATTTATTT  
 CCCATTGGTG AAAGTCAAAA AAAAAAAAAA AAA  
 GGGTAACCAC TTTCAGTTTT TTTTTTTTTT TTT